



THE OUTLOOK FOR EUROPEAN FINANCIAL STABILITY

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- ▣ February 13, 2015

FAILURE OF FINANCIAL INSTITUTIONS

- September 15, 2008 Lehman declared bankruptcy and the most severe events of the financial crisis began.
- The U.S. had arranged an orderly rescue of Fannie Mae and Freddie Mac the week before and then saved AIG, Merrill Lynch, Citigroup, Bank of America, Morgan Stanley, Goldman Sachs. Washington Mutual failed and Wachovia was purchased in the following days.
- Should we rescue such firms? Should we have rescued Lehman?
- If firms count on being rescued, they will take on too much risk.
- Is there a third choice?



SYSTEMIC RISK

- WHEN THE FAILURE OF AN INSTITUTION TO MEET ITS OBLIGATIONS HAS SERIOUS CONSEQUENCES FOR THE REAL ECONOMY
- FAILURE OF ONE INSTITUTION WILL BE MUCH MORE DANGEROUS IF THE WHOLE FINANCIAL SECTOR IS WEAK.



REGULATORY CHALLENGE

- ENSURE THAT FINANCIAL INSTITUTIONS HAVE SUFFICIENT CAPITAL SO THAT THEY CAN NOT ONLY SURVIVE A FINANCIAL CRISIS, BUT CONTINUE TO INTERMEDIATE AND PROVIDE FINANCIAL SERVICES TO THE REAL ECONOMY.
 - GOOD REGULATION IS PREVENTION – NOT RESCUE
- 

DEFINITION of SRISK

- *How much capital would a financial institution need to raise in order to function normally if we have another financial crisis?*
- We measure this econometrically based on market data on equities and balance sheet data on liabilities. We update weekly on V-LAB for US and Global financial firms. We call this *SRISK*. It is the basis of the Stern Systemic Risk Rankings.
- Principle investigators: Viral Acharya, Matt Richardson and me at the Volatility Institute at NYU's Stern School. Collaboration with HEC Lausanne and the Institute for Global Finance at University of New South Wales. Contributions by Christian Brownlees, Rob Capellini, Diane Perriet, Emil Siriwardane.
- References: Acharya, Pedersen, Phillipon, Richardson "Measuring Systemic Risk (2010); Acharya, Engle, Richardson "Capital Shortfall, A New Approach to Ranking and Regulating Systemic Risks, AEAPP (2012), Brownlees and Engle, "Volatilities, Correlations and Tails for Systemic Risk Measurement", 2010

SRISK

- SRISK is computed from:

$$\begin{aligned} SRISK_{i,t} &= E_t \left(Capital\ Shortfall_i \mid Crisis \right) \\ &= E_t \left(k \left(Debt_{t+n} + Equity_{t+n} \right) - Equity_{t+n} \mid Crisis_{t+n} \right) \\ &= \left[k \frac{Debt_{i,t}}{ASSETS} - (1-k) \left(1 - LRMES_{i,t} \right) \frac{Equity_{i,t}}{ASSETS} \right] ASSETS \end{aligned}$$

- Where k is a prudential level of equity relative to assets.
- LRMES is the decline in equity values to be expected if there is another financial crisis.
- SRISK depends upon size, leverage and risk.*

SRISK IS A STRESS TEST

- The stress scenario is a 40% collapse in the global equity market over six months.
- The capital requirement is that, under stress, equity exceed 8% of total assets
- Total Assets are measured as Quasi Assets which are accounting liabilities plus market equity
- For IFRS firms, a 5.5% capital requirement is used.



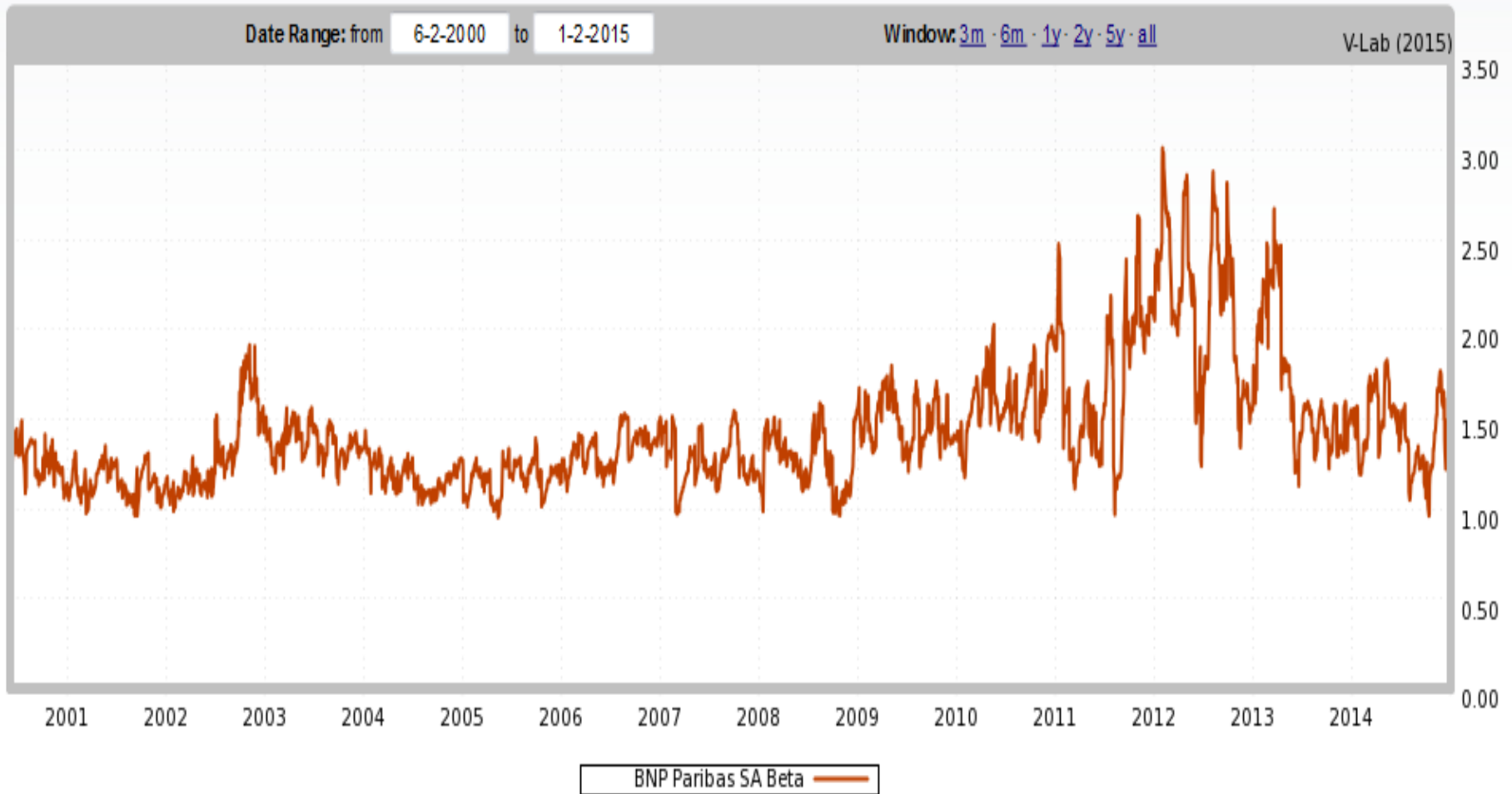
ECONOMETRICS OF SRISK

DYNAMIC CONDITIONAL BETA

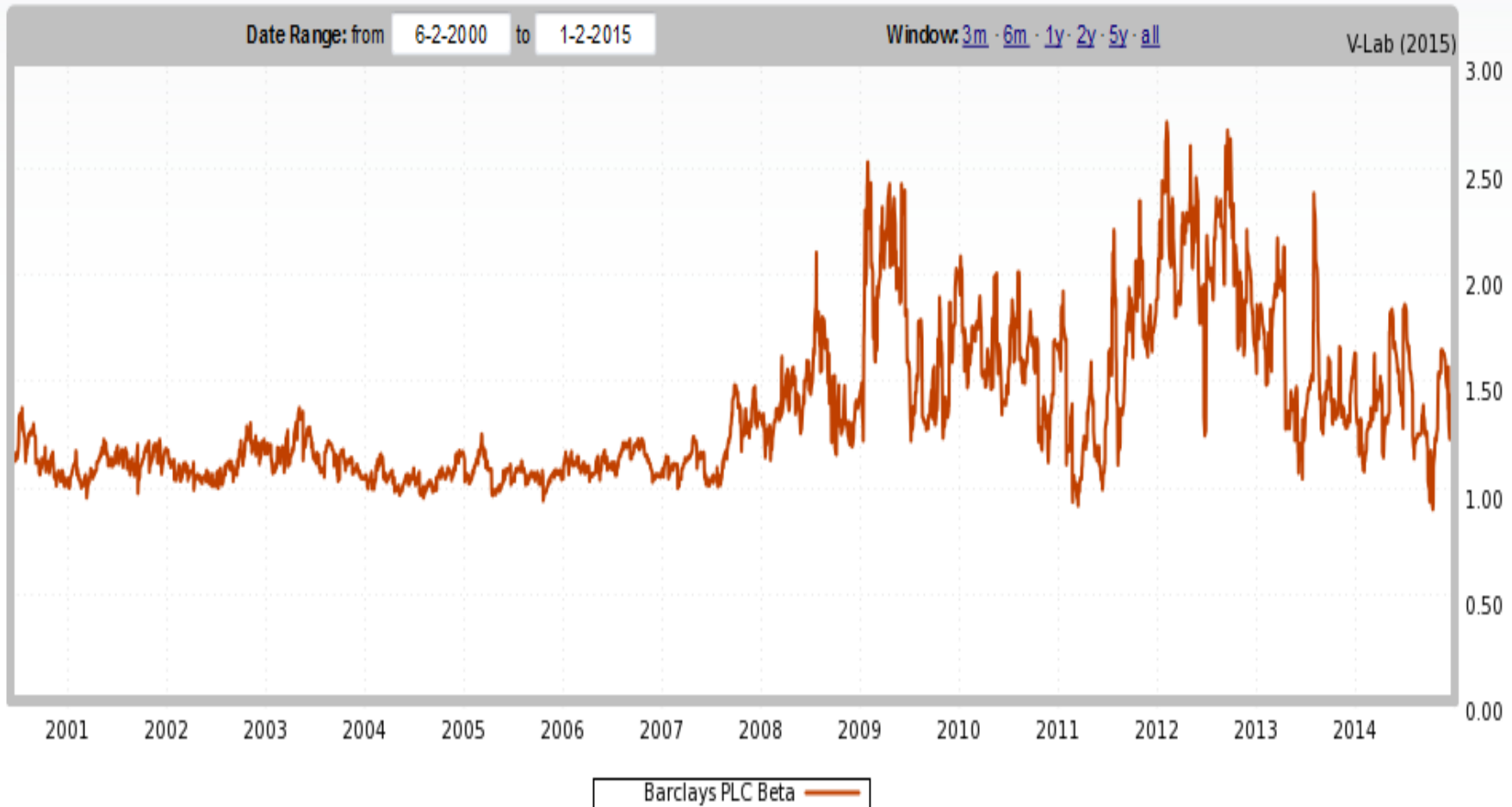
WHAT IS BETA?


- Beta measures the decline in a firm stock price as the market declines.
- Beta is not constant – it is a correlation times the ratio of firm volatility to market volatility.
- We use a global ETF and correct for asynchronicity in daily returns.
- We estimate volatility (GJR) and correlation (DCC) models for more than 1000 global firms.
- We do this every week and post it on V-LAB.

BETA FOR BNP PARIBAS



Barclay's Beta

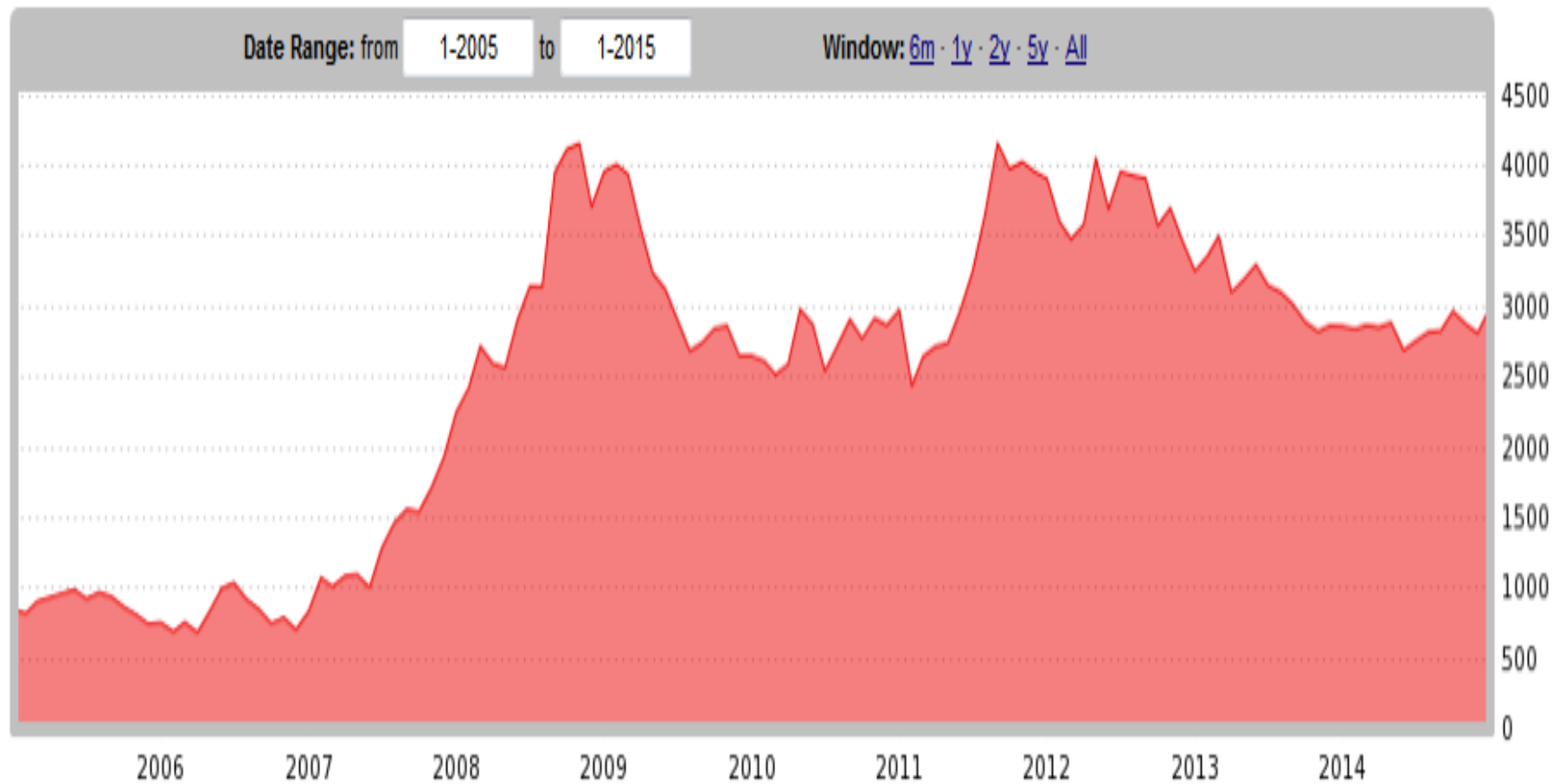




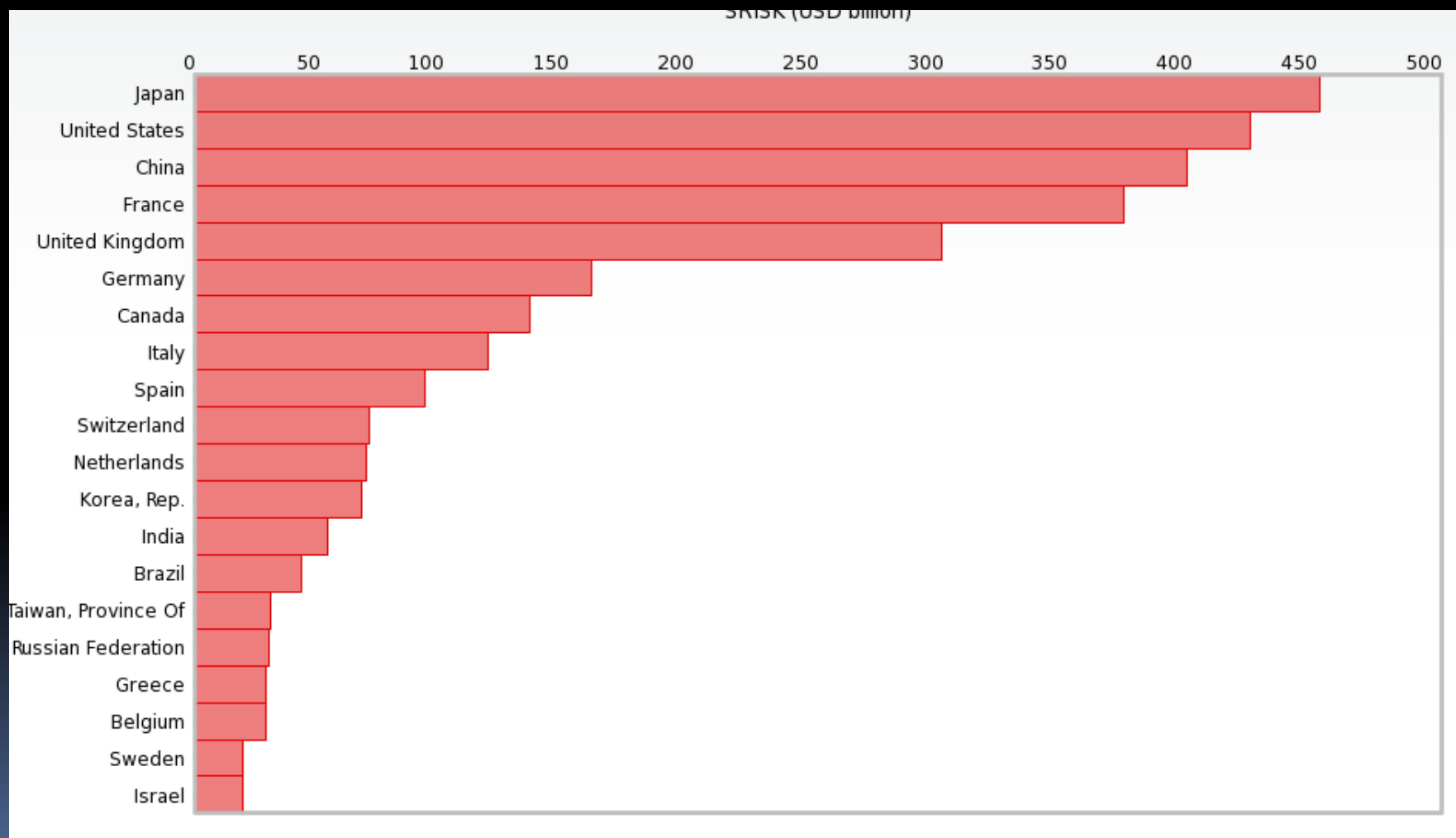
THE NYU STERN SYSTEMIC RISK RANKINGS

WORLD SRISK – LAST 10 YEARS

Risk Analysis Overview - World Financials Total SRISK (US\$ billion)

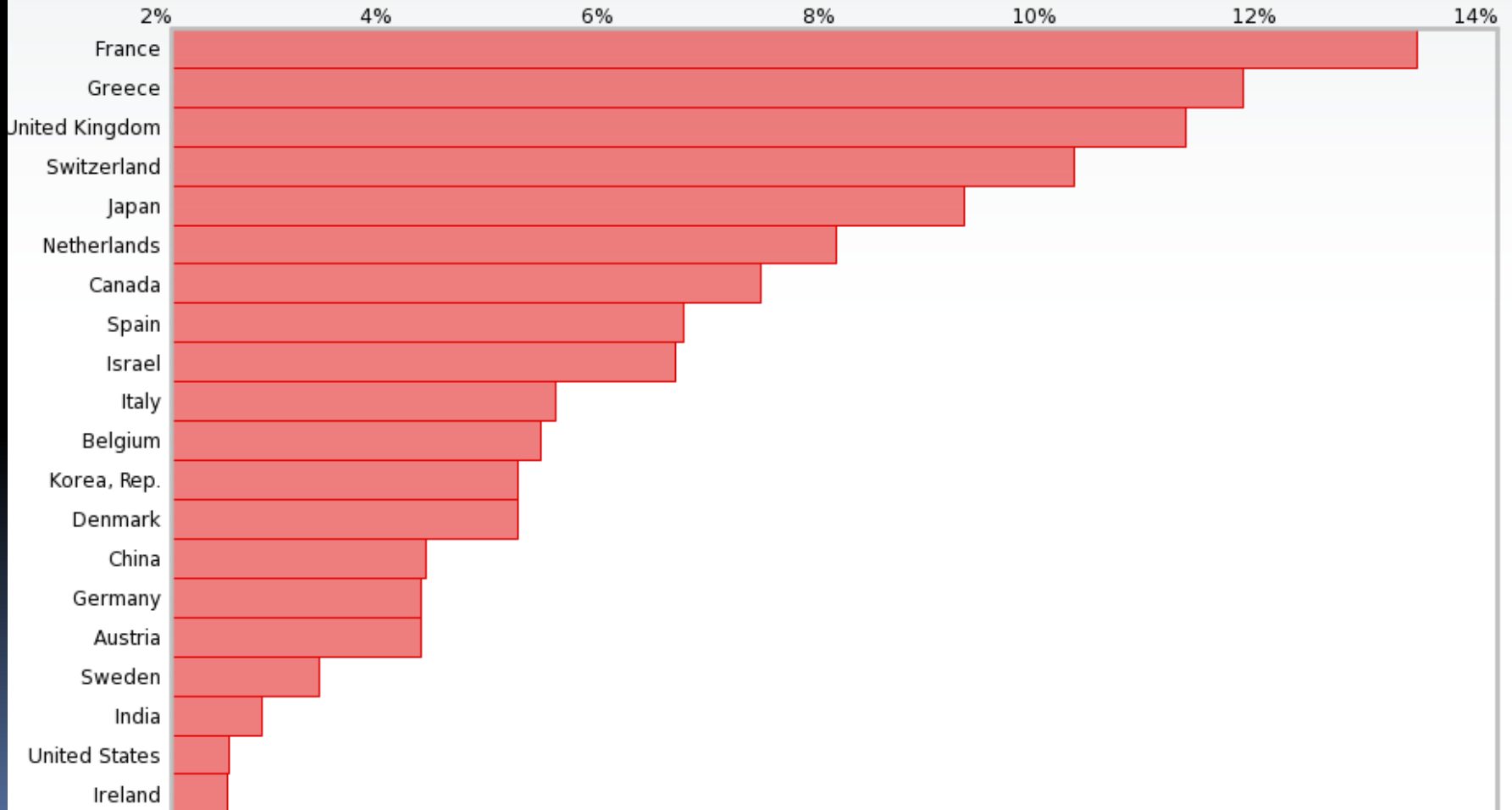


WHERE IS THE RISK today?



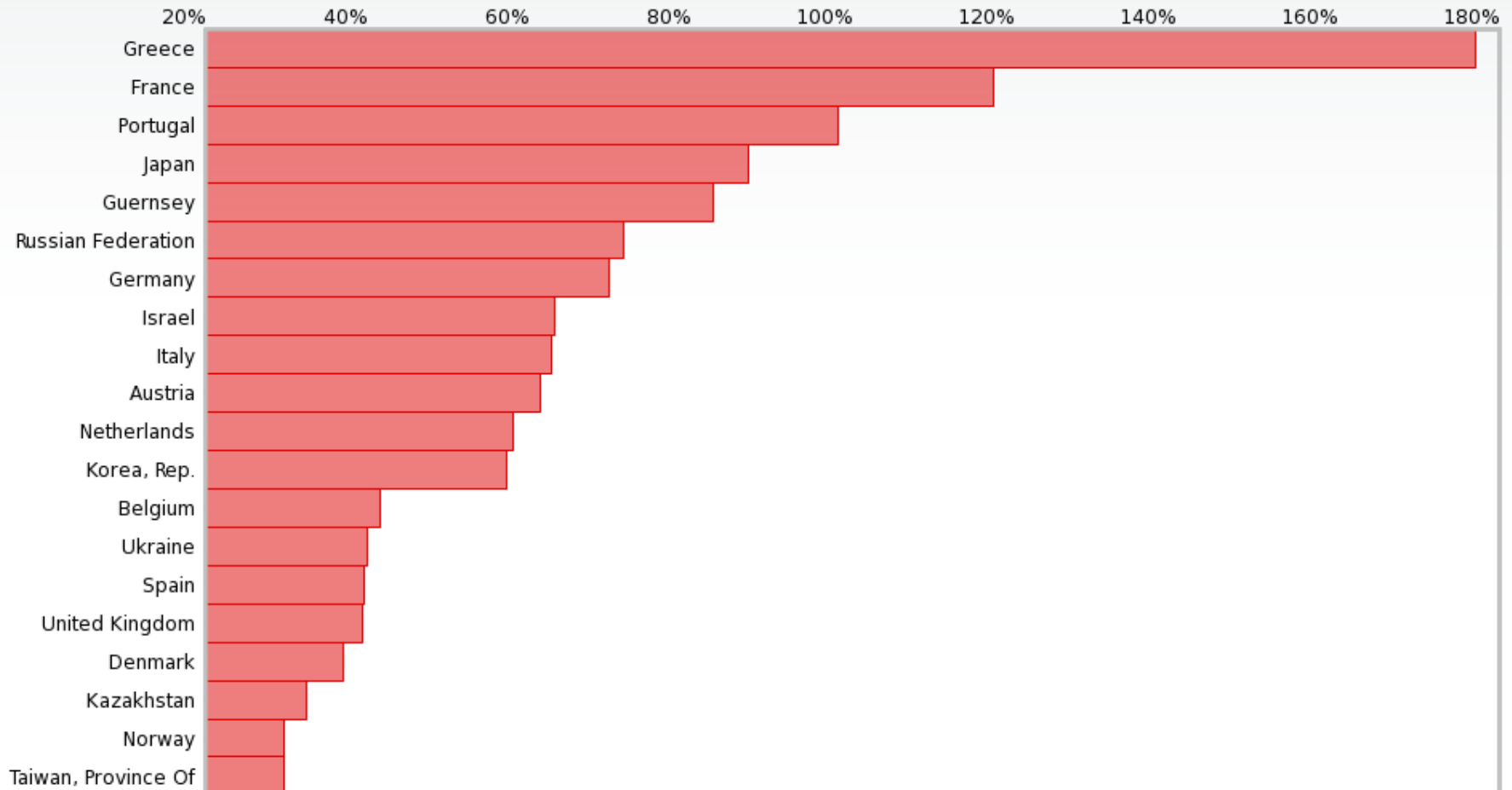
AS PERCENT OF GDP

Global Systemic Risk by Country
SRISK / GDP



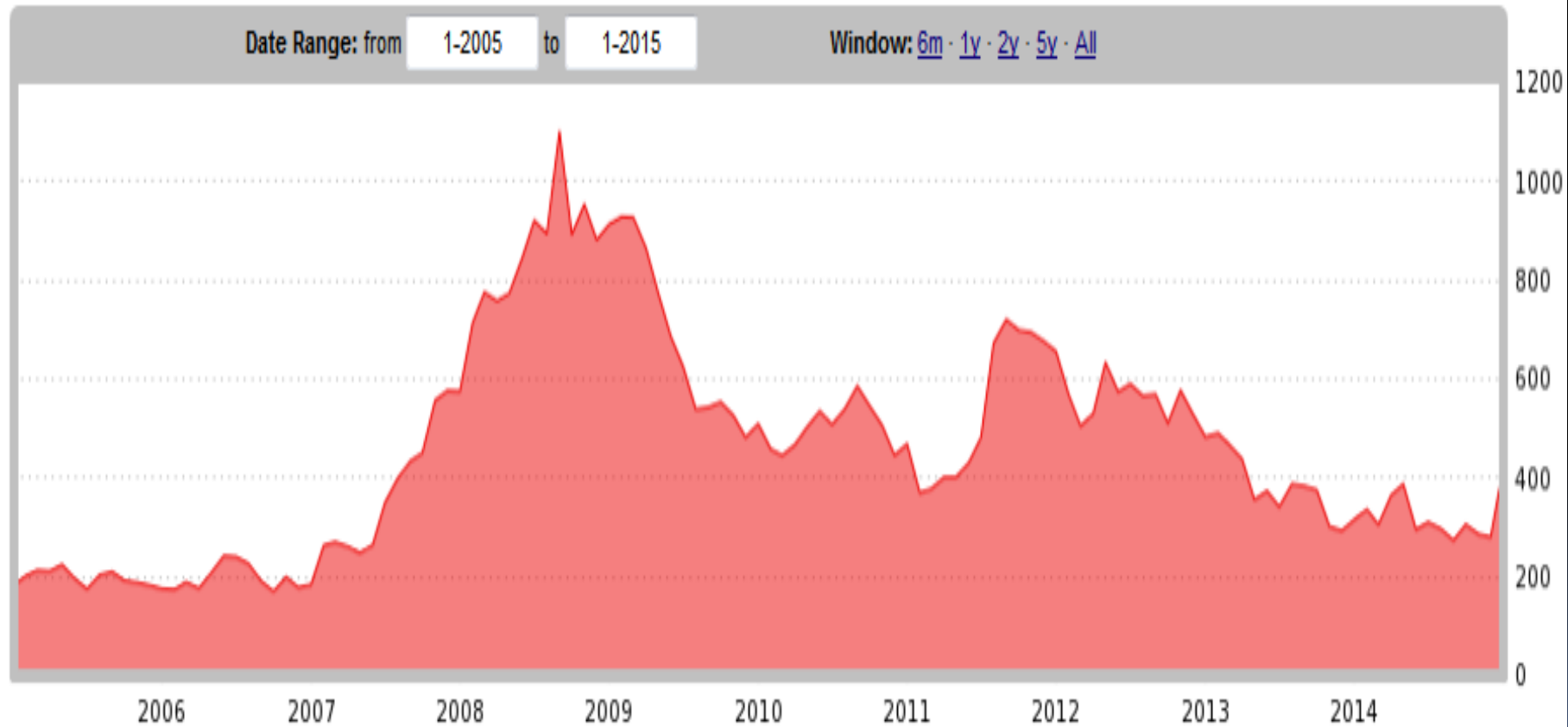
AS A PERCENTAGE OF MARKET CAP

Global Systemic Risk by Country
SRISK / Market Cap

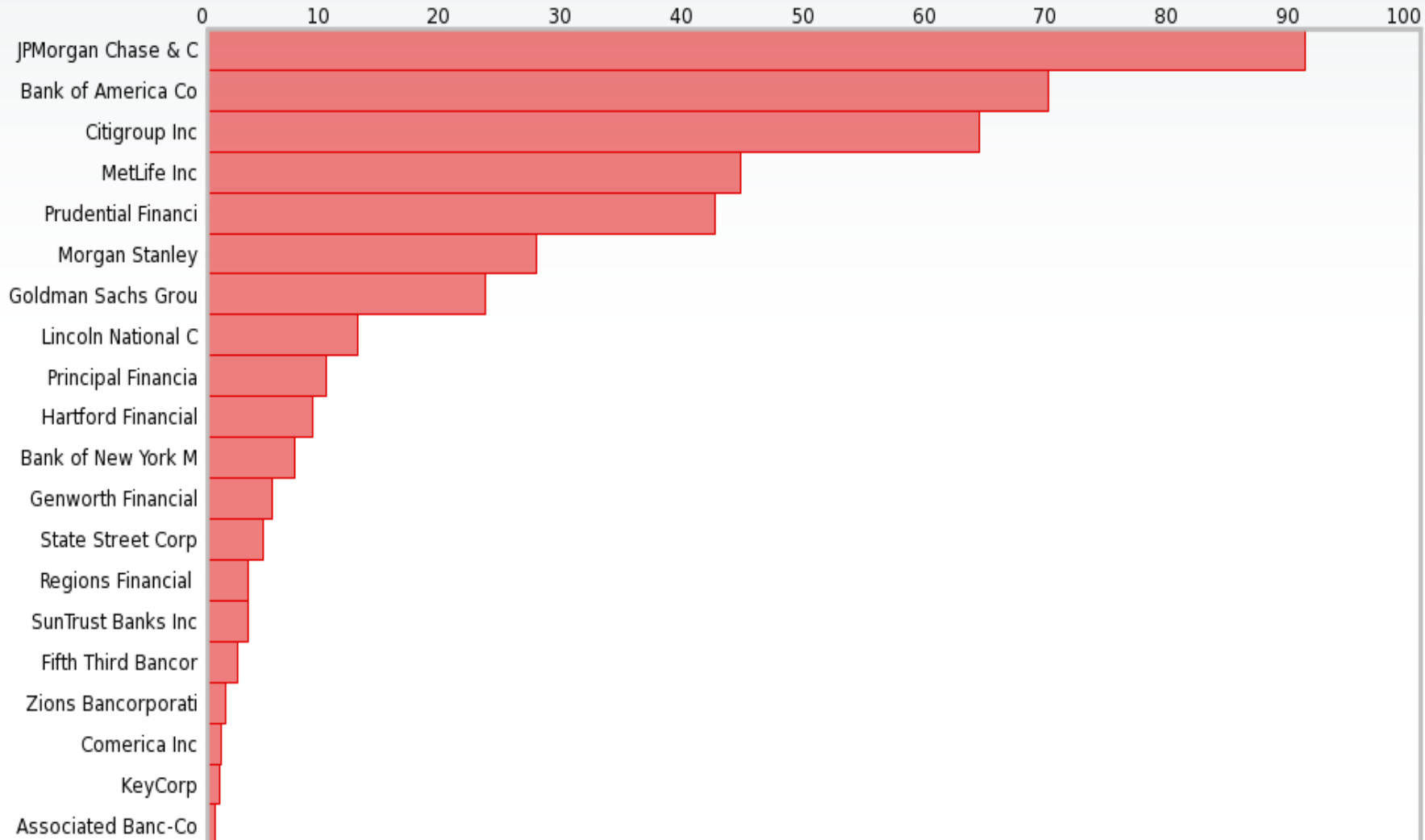


US SRISK – LAST 10 YEARS

Risk Analysis Overview - United States Financials Total SRISK (US\$ billion)

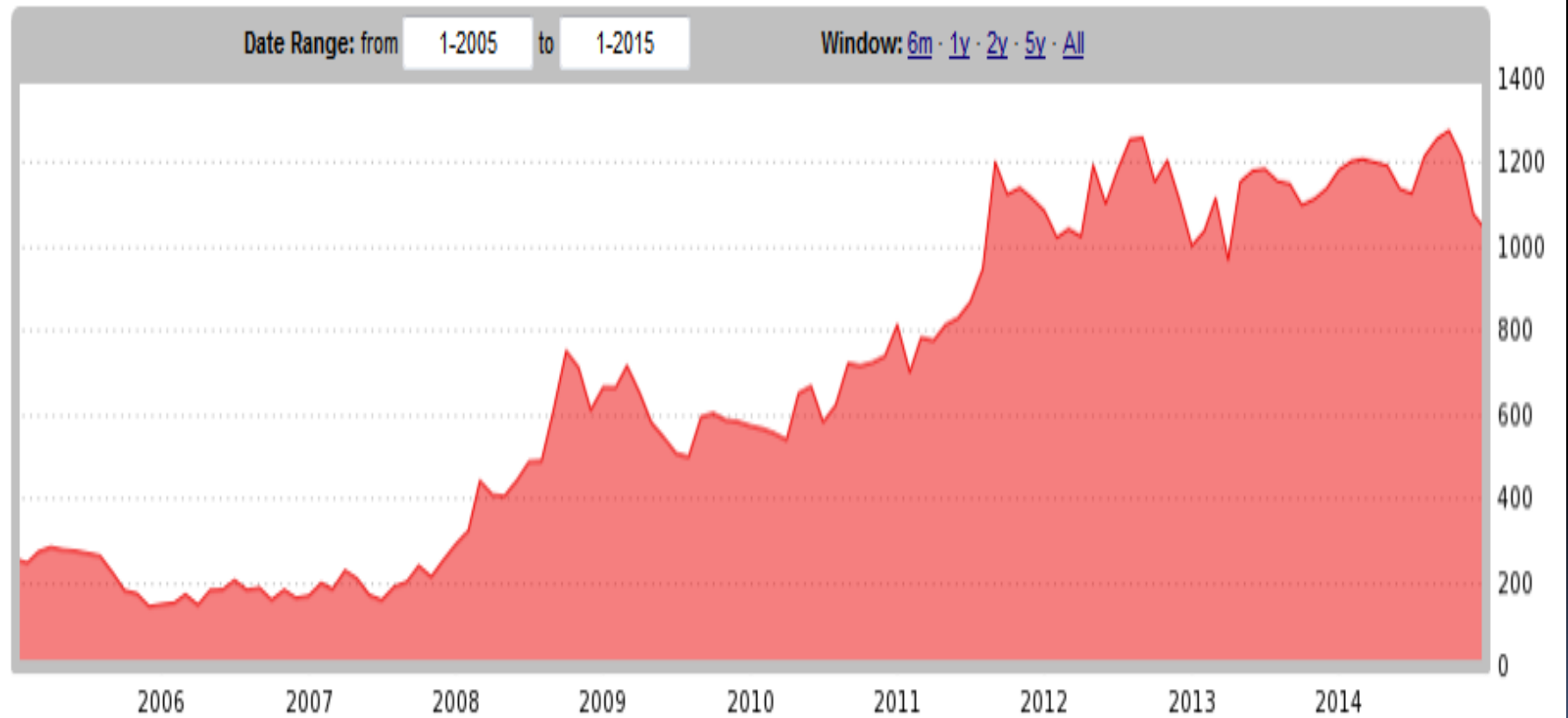


WHERE IS THE RISK IN THE US?



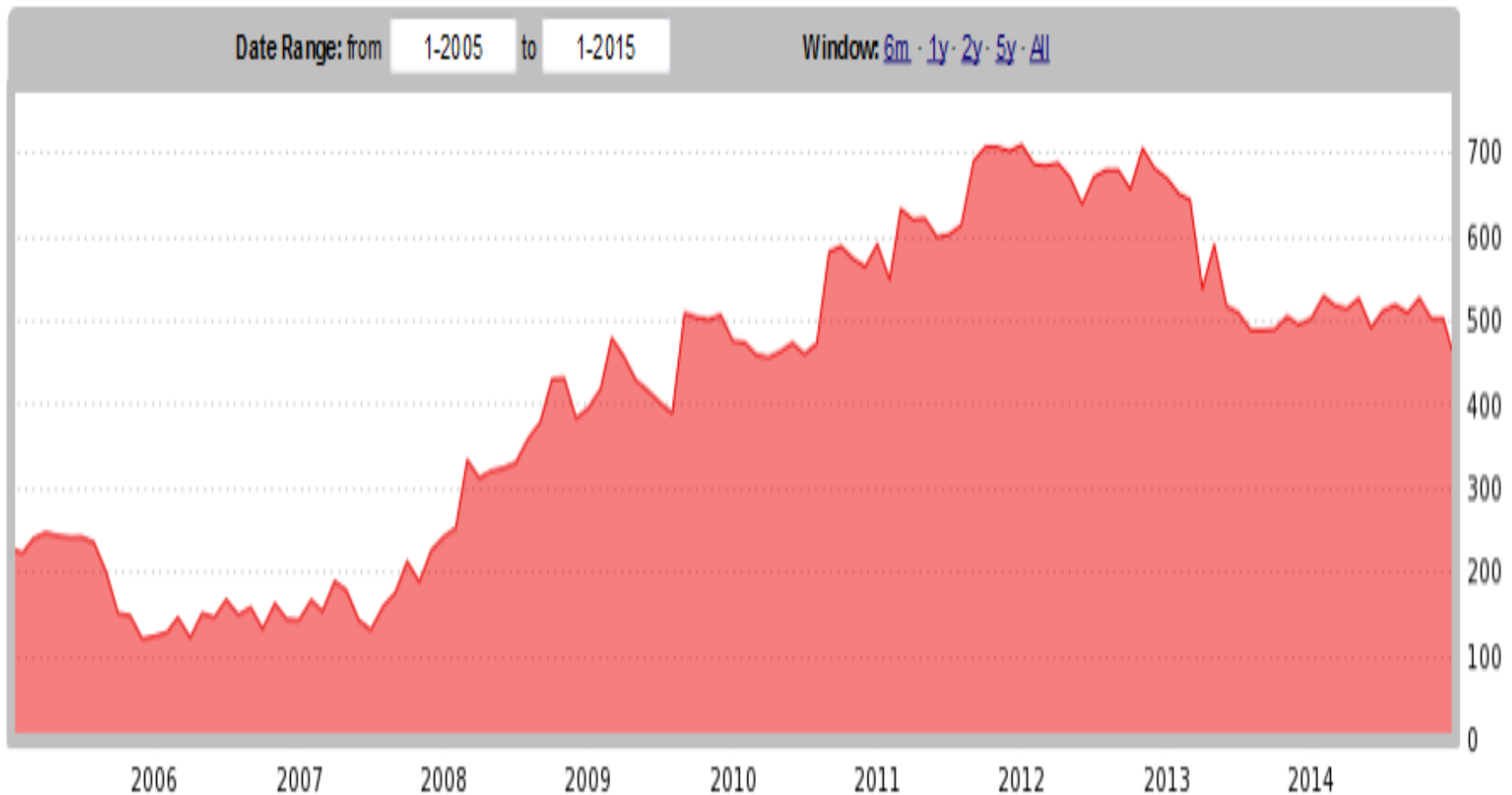
ASIA SINCE 2005

Risk Analysis Overview - Asia Financials Total SRISK (US\$ billion)



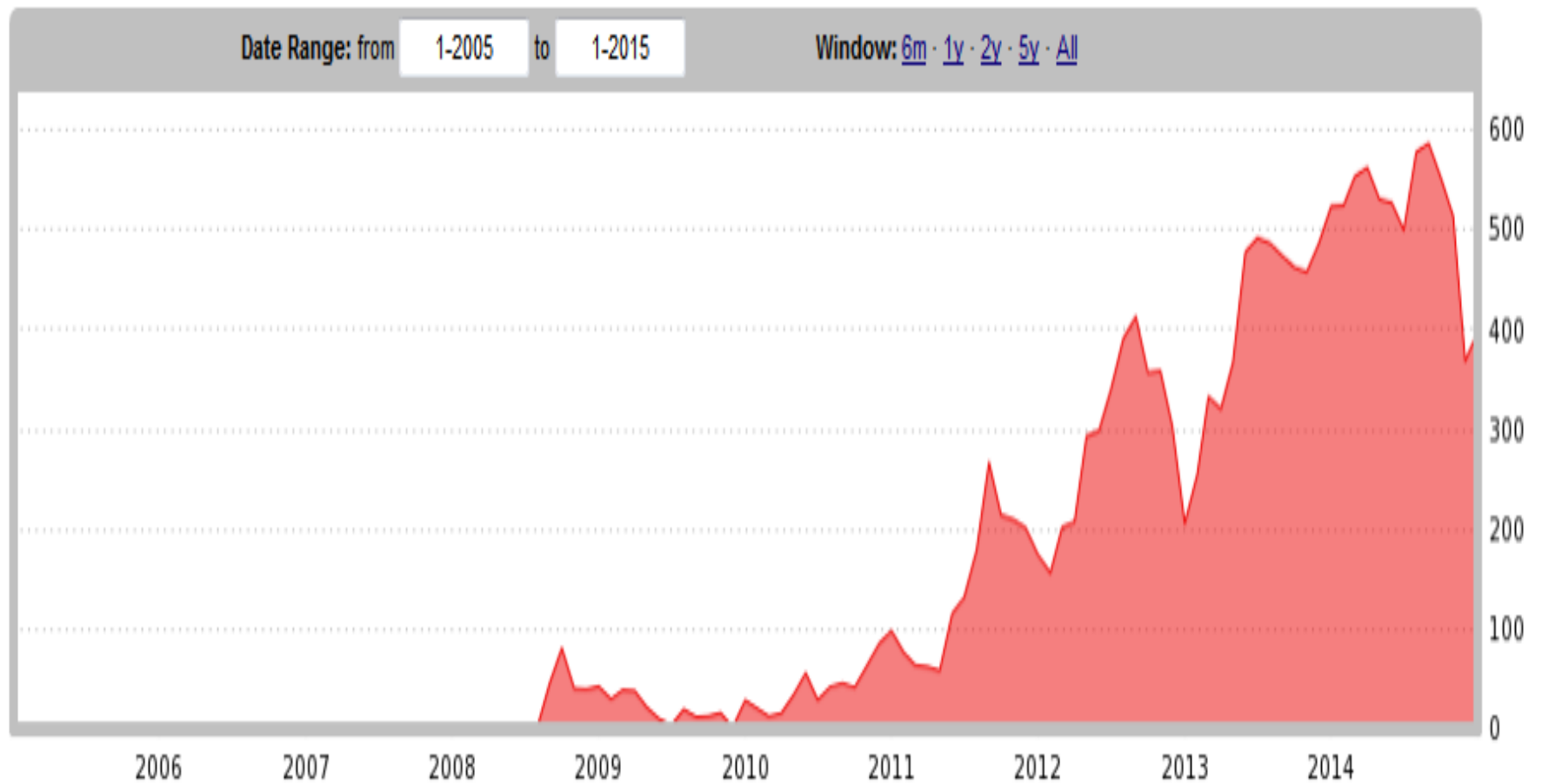
Japan last decade

Risk Analysis Overview - Japan Financials Total SRISK (US\$ billion)



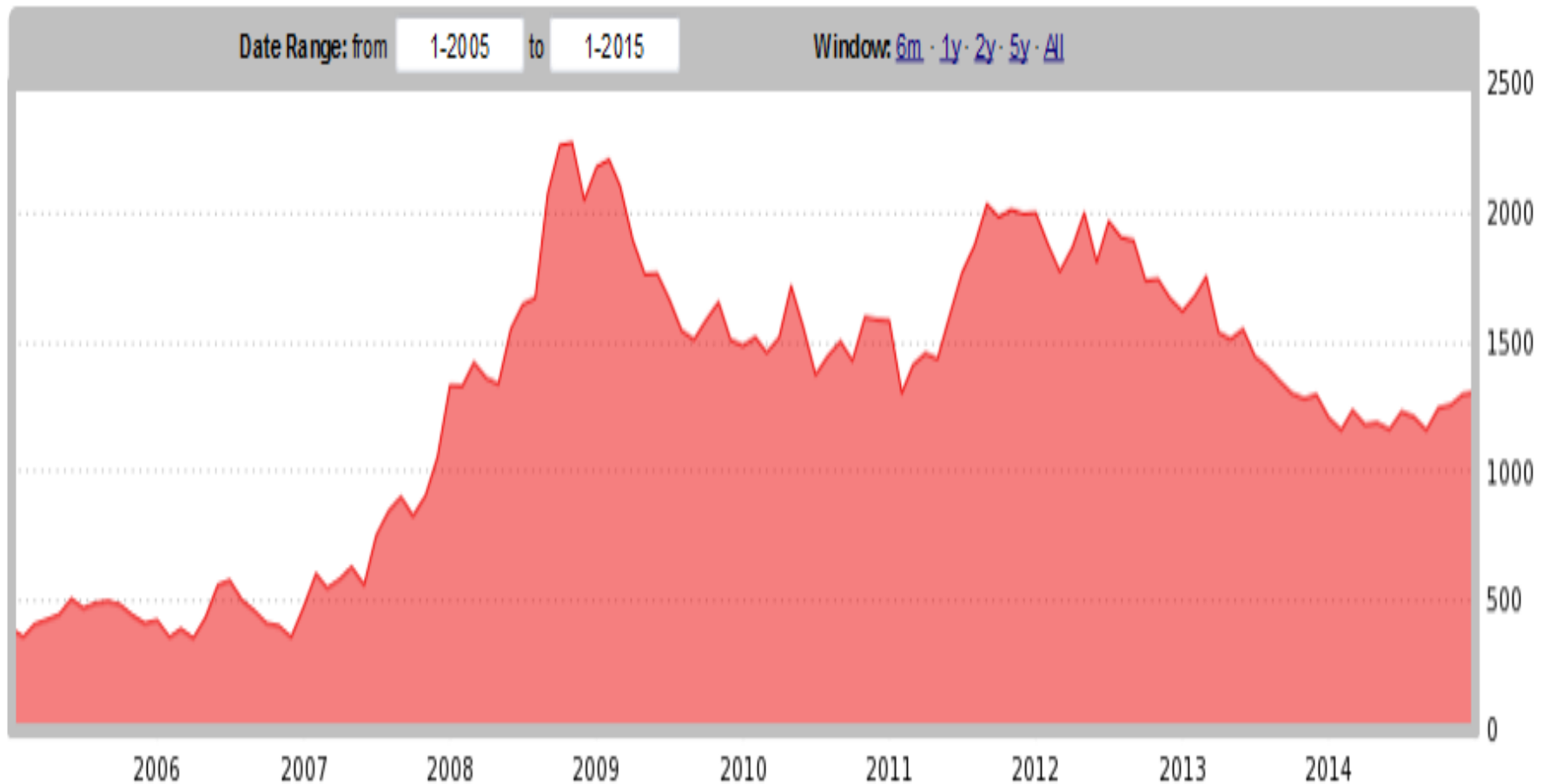
CHINA SINCE 2005!!

Risk Analysis Overview - China Financials Total SRISK (US\$ billion)



EUROPE SINCE 2005

Risk Analysis Overview - Europe Financials Total SRISK (US\$ billion)



EUROPEAN FINANCIAL FIRMS

Systemic Risk Rankings for Jan 30, 2015 View changes

<u>Institution</u>	<u>SRISK%</u>	<u>RNK</u> ▲	<u>SRISK (\$ m)</u>	<u>MES</u>	<u>Beta</u>	<u>Cor</u>	<u>Vol</u>	<u>Lvg</u>
<u>BNP Paribas SA</u>	8.13	1	109,849	4.47	1.75	0.55	37.4	39.05
<u>Deutsche Bank AG</u>	7.15	2	96,638	4.30	1.68	0.72	32.7	52.67
<u>Credit Agricole SA *</u>	7.14	3	96,529	3.95	1.55	0.52	32.7	66.58
<u>Barclays PLC</u>	6.58	4	88,929	3.83	1.50	0.48	30.6	37.50
<u>Societe Generale SA</u>	5.33	5	71,994	4.60	1.80	0.59	34.1	48.71
<u>Royal Bank of Scotland Group PLC</u>	4.01	6	54,187	3.17	1.24	0.43	31.6	26.50
<u>ING Groep NV</u>	3.39	7	45,824	4.71	1.84	0.59	34.0	25.57
<u>Banco Santander SA</u>	3.34	8	45,090	5.11	2.00	0.54	53.3	16.49
<u>UniCredit SpA</u>	3.20	9	43,259	5.22	2.04	0.57	44.8	30.42
<u>Credit Suisse Group AG</u>	2.70	10	36,547	3.93	1.54	0.50	29.0	29.02
<u>London Stock Exchange Group PLC</u>	2.61	11	35,247	2.62	1.03	0.40	25.3	63.71
<u>Commerzbank AG</u>	2.40	12	32,386	3.52	1.37	0.53	31.6	52.44
<u>Natixis SA *</u>	2.23	13	30,117	3.77	1.46	0.49	30.8	37.26
<u>AXA SA</u>	1.98	14	26,790	3.94	1.54	0.60	25.2	17.92
<u>HSBC Holdings PLC</u>	1.94	15	26,251	2.14	0.84	0.51	18.9	15.41
<u>Lloyds Banking Group PLC</u>	1.92	16	25,883	2.54	1.00	0.41	22.6	17.82
<u>UBS Group AG</u>	1.82	17	24,600	3.43	1.34	0.51	25.6	17.23
<u>Legal & General Group PLC</u>	1.55	18	20,963	2.77	1.08	0.42	21.2	27.37
<u>CNP Assurances</u>	1.55	19	20,951	3.08	1.20	0.52	22.4	42.40
<u>Sberbank of Russia</u>	1.45	20	19,635	5.78	2.28	0.33	80.6	25.98



NYU Stern Systemic Risk Rankings



“A Look Back”



AUGUST 29, 2008 US

Systemic Risk Rankings for View changes

<u>Institution</u>	<u>SRISK%</u>	<u>RNK</u> ▲	<u>SRISK (\$ m)</u>	<u>LRMES</u>	<u>Beta</u>	<u>Cor</u>	<u>Vol</u>	<u>Lvg</u>
<u>Citigroup Inc</u>	12.79	1	138,091	80.00	2.61	0.79	63.4	19.99
<u>JPMorgan Chase & Co</u>	10.14	2	109,492	82.00	2.42	0.74	62.9	13.42
<u>Bank of America Corp</u>	8.97	3	96,900	79.00	2.90	0.74	75.0	11.94
<u>Morgan Stanley</u>	6.51	4	70,259	77.24	2.09	0.74	53.7	23.01
<u>Freddie Mac</u>	6.38	5	68,874	85.00	5.01	0.44	221.2	297.76
<u>Merrill Lynch</u>	6.31	6	68,124	84.00	3.43	0.78	83.8	22.45
<u>Fannie Mae</u>	6.21	7	67,088	93.00	5.51	0.51	205.4	115.68
<u>American International Group Inc</u>	6.13	8	66,211	80.00	3.47	0.69	97.0	17.62
<u>Goldman Sachs Group Inc/The</u>	5.34	9	57,654	58.00	1.70	0.75	43.3	16.99
<u>Wachovia Bank</u>	5.00	10	54,008	85.00	3.06	0.66	87.3	22.40
<u>Lehman Brothers</u>	4.41	11	47,613	86.00	4.99	0.74	130.2	55.88
<u>MetLife Inc</u>	2.78	12	30,044	67.00	1.42	0.79	34.4	14.56
<u>Washington Mutual</u>	2.00	13	21,616	88.00	2.71	0.45	119.8	41.50
<u>Prudential Financial Inc</u>	1.99	14	21,476	49.00	1.35	0.72	36.1	15.39
<u>Hartford Financial Services Group Inc/The</u>	1.83	15	19,766	68.00	1.70	0.74	43.9	17.68
<u>Wells Fargo & Co</u>	1.68	16	18,166	71.00	1.90	0.69	52.8	6.60

FEB 28, 2007 US

Systemic Risk Rankings for 2007-02-28 View changes

<u>Institution</u>	<u>SRISK%</u>	<u>RNK</u> ▲	<u>SRISK (\$ m)</u>	<u>LRMES</u>	<u>Beta</u>	<u>Cor</u>	<u>Vol</u>	<u>Lvg</u>
<u>Morgan Stanley</u>	20.32	1	67,314	67.00	1.57	0.74	41.9	15.34
<u>Fannie Mae</u>	10.61	2	35,161	43.00	0.76	0.66	22.9	15.50
<u>Citigroup Inc</u>	9.01	3	29,843	51.00	0.91	0.70	26.0	8.15
<u>Merrill Lynch</u>	8.89	4	29,460	49.00	0.95	0.68	27.8	11.84
<u>Freddie Mac</u>	8.53	5	28,276	17.00	0.44	0.59	14.8	18.50
<u>Lehman Brothers</u>	8.49	6	28,125	57.00	1.35	0.70	38.1	15.06
<u>Goldman Sachs Group Inc/The</u>	8.44	7	27,975	46.00	1.54	0.87	35.0	11.42
<u>Bear Stearns</u>	6.93	8	22,950	55.00	1.06	0.68	30.2	21.91
<u>JPMorgan Chase & Co</u>	5.15	9	17,065	48.00	0.71	0.71	19.6	8.23
<u>MetLife Inc</u>	4.29	10	14,222	43.00	0.88	0.64	27.5	11.26
<u>Hartford Financial Services Group Inc/The</u>	3.56	11	11,799	54.00	0.88	0.69	25.3	11.16
<u>Prudential Financial Inc</u>	2.42	12	8,009	33.87	0.58	0.58	19.9	10.90
<u>Lincoln National Corp</u>	1.55	13	5,137	53.00	1.10	0.75	29.2	9.80
<u>Washington Mutual</u>	0.64	14	2,123	38.00	0.57	0.48	23.9	8.78
<u>Countrywide Financial</u>	0.43	15	1,434	35.00	0.83	0.47	34.9	9.27
<u>Wachovia Bank</u>	0.39	16	1,279	49.00	0.87	0.66	26.5	7.02

JAN 31, 2005

Systemic Risk Rankings for 2005-01-31 View changes

<u>Institution</u>	<u>SRISK%</u>	<u>RNK</u> ▲	<u>SRISK (\$ m)</u>	<u>LRME S</u>	<u>Beta</u>	<u>Cor</u>	<u>Vol</u>	<u>Lvg</u>
<u>Fannie Mae</u>	19.60	1	49,242	49.00	1.02	0.43	25.9	16.72
<u>Morgan Stanley</u>	13.97	2	35,092	59.92	1.13	0.65	18.9	12.82
<u>Freddie Mac</u>	11.11	3	27,900	20.00	0.78	0.51	16.7	17.96
<u>JPMorgan Chase & Co</u>	8.69	4	21,840	49.00	1.00	0.70	15.5	8.92
<u>Merrill Lynch</u>	7.53	5	18,913	44.00	1.14	0.73	17.2	11.67
<u>Lehman Brothers</u>	6.23	6	15,648	49.00	0.94	0.62	16.3	14.69
<u>Bear Stearns</u>	5.99	7	15,053	51.00	0.82	0.50	17.4	24.67
<u>Prudential Financial Inc</u>	5.98	8	15,013	40.00	0.98	0.58	18.6	14.69
<u>Hartford Financial Services Group Inc/The</u>	4.92	9	12,367	60.00	1.18	0.57	22.2	13.42
<u>MetLife Inc</u>	4.64	10	11,656	45.00	1.09	0.54	22.1	12.25
<u>Goldman Sachs Group Inc/The</u>	4.25	11	10,689	38.00	0.81	0.52	17.1	10.70
<u>Lincoln National Corp</u>	2.24	12	5,617	57.00	1.23	0.63	21.4	14.66
<u>Genworth Financial Inc</u>	1.77	13	4,456	21.00	0.54	0.29	20.6	24.42
<u>Washington Mutual</u>	1.38	14	3,463	40.00	0.75	0.45	18.0	9.13
<u>UNUM Group</u>	0.83	15	2,084	70.00	0.73	0.30	28.0	9.57
<u>State Street Corp</u>	0.40	16	1,013	56.25	1.15	0.49	26.0	6.88

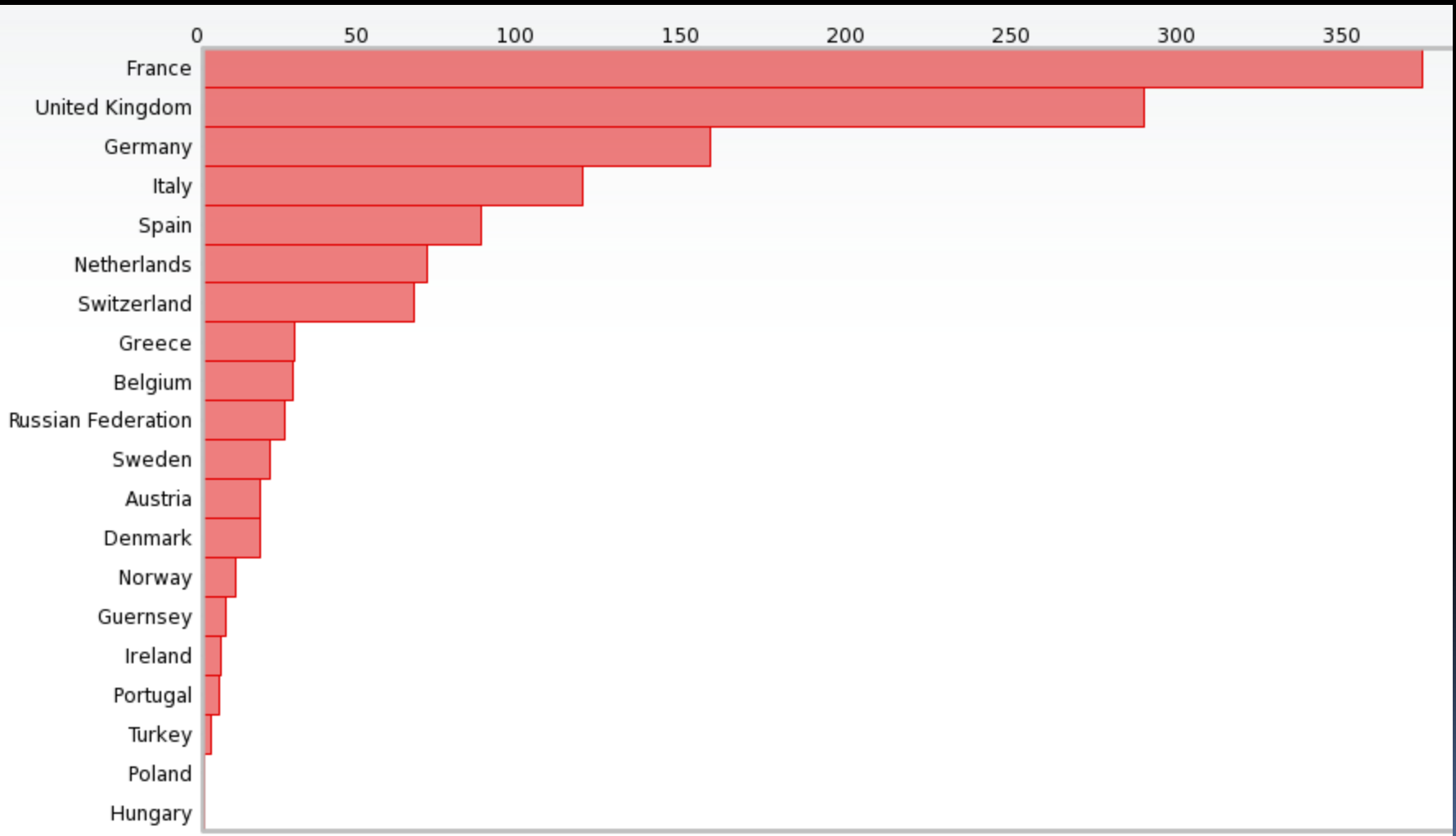
SUMMARY OF RESULTS

- Rank correlations between minimum T₁ Leverage Ratio and VLAB stressed leverage ratio at the same time:
 - CCAR₁₂ correlation=.846
 - CCAR₁₃ correlation=.877
 - EBA₁₁ correlation = .570 (final leverage ratio)
- Rank correlations between Risk Weights and Risk and VLAB risk are much lower, often <0
- Rank correlations between stock performance and stress ratios for EBA 2011
 - VLAB=.354, EBA=.046

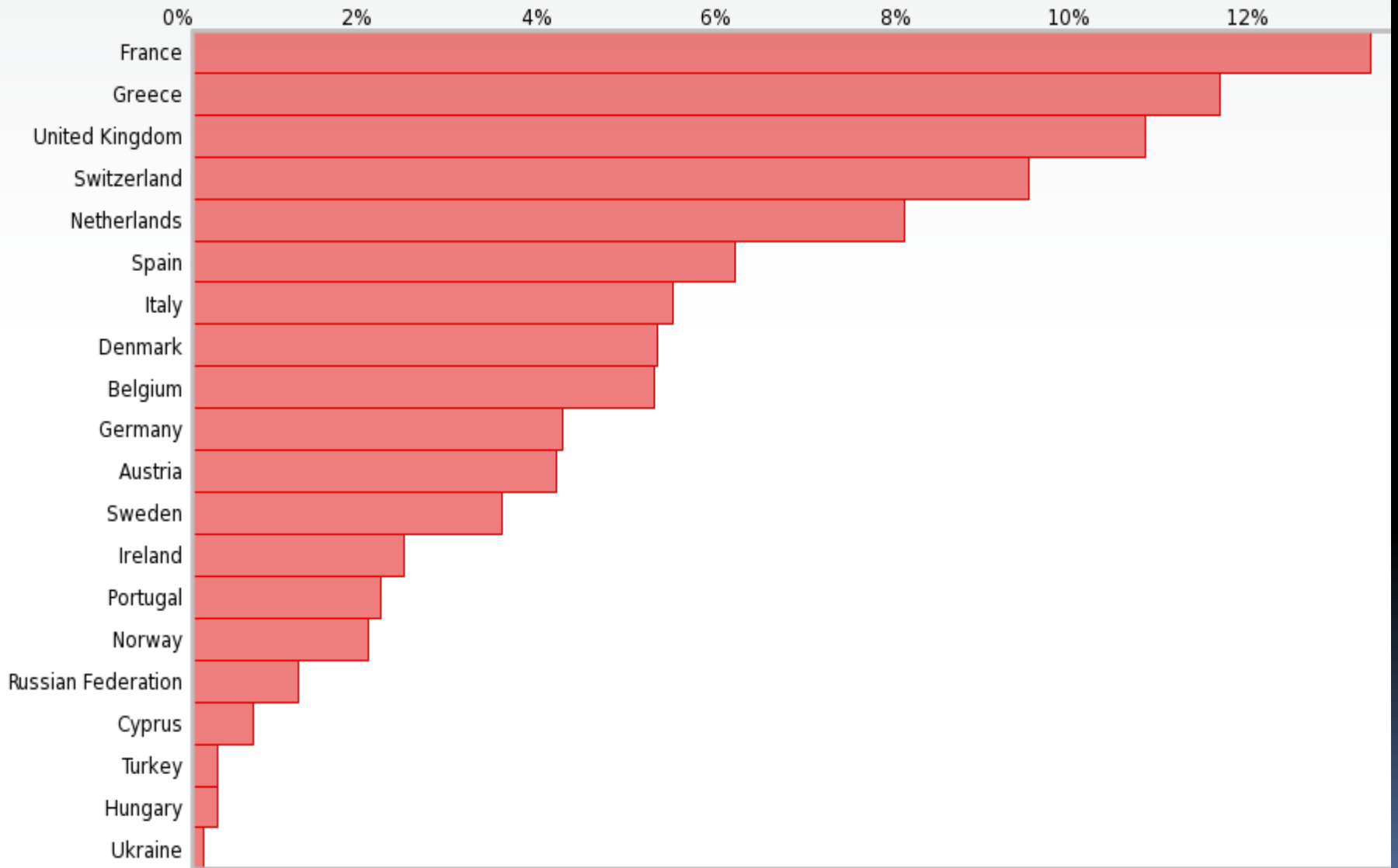


THE OUTLOOK FOR FINANCIAL STABILITY IN EUROPE

EUROPE SRISK

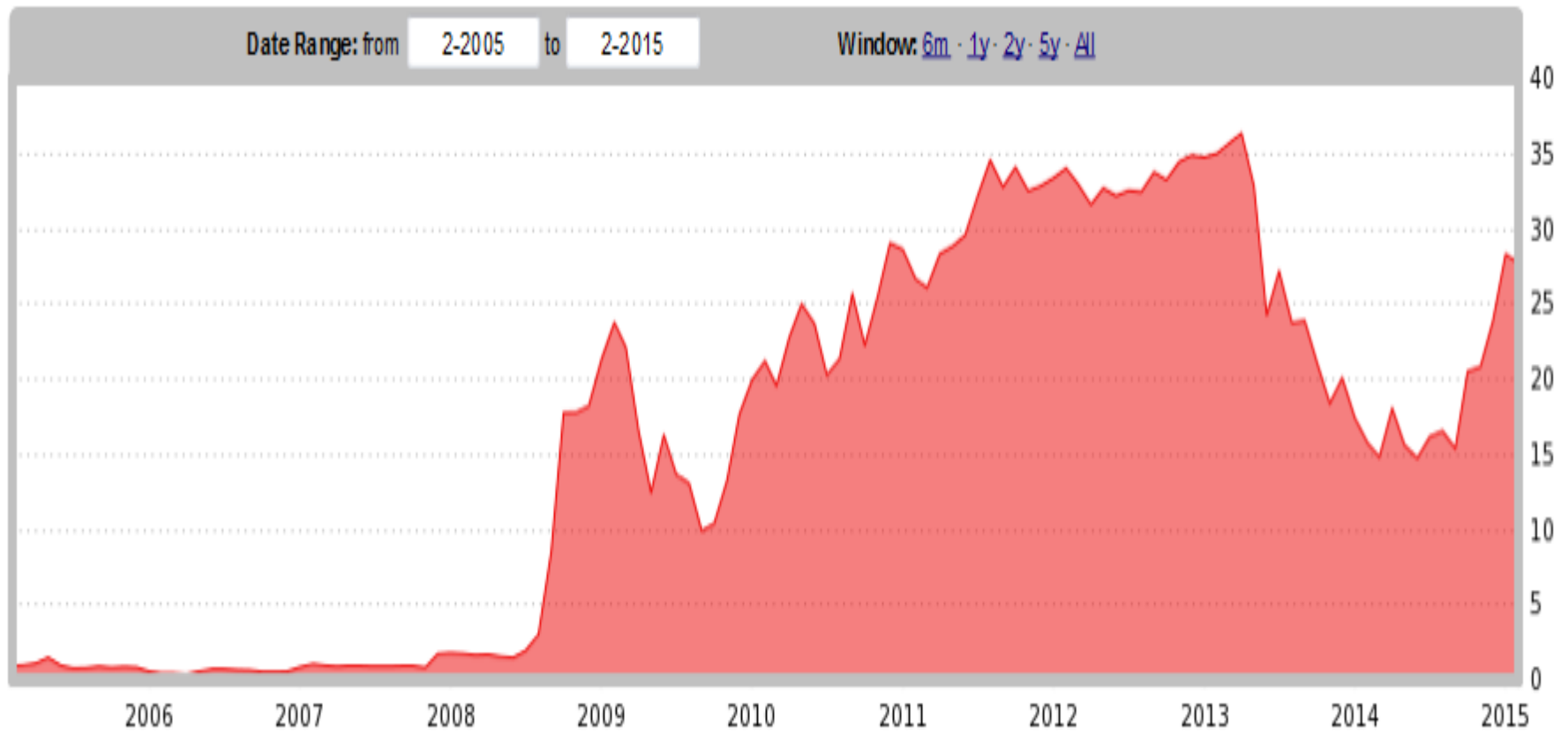


EUROPEAN SRISK/GDP



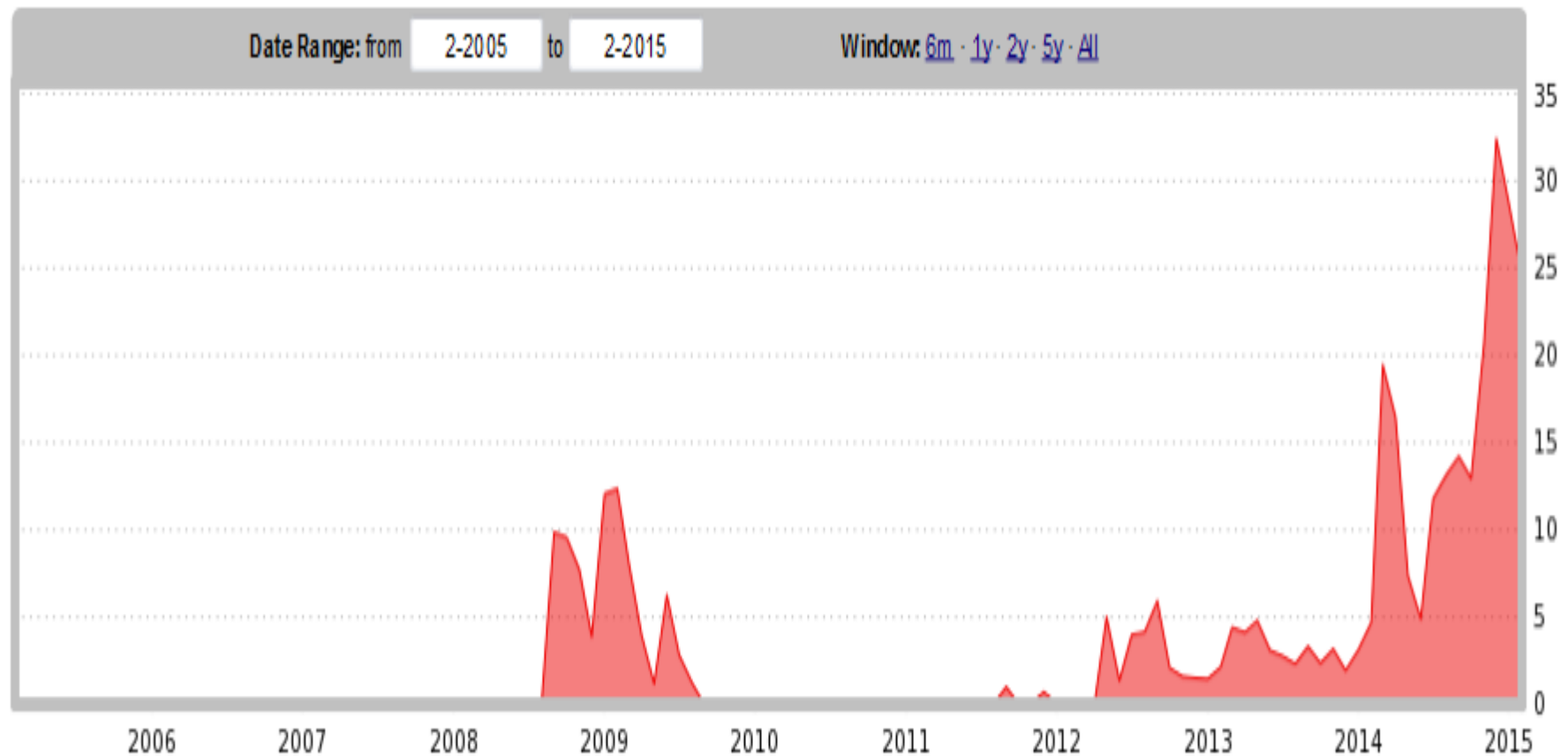
GREECE

Risk Analysis Overview - Greece Financials Total SRISK (US\$ billion)



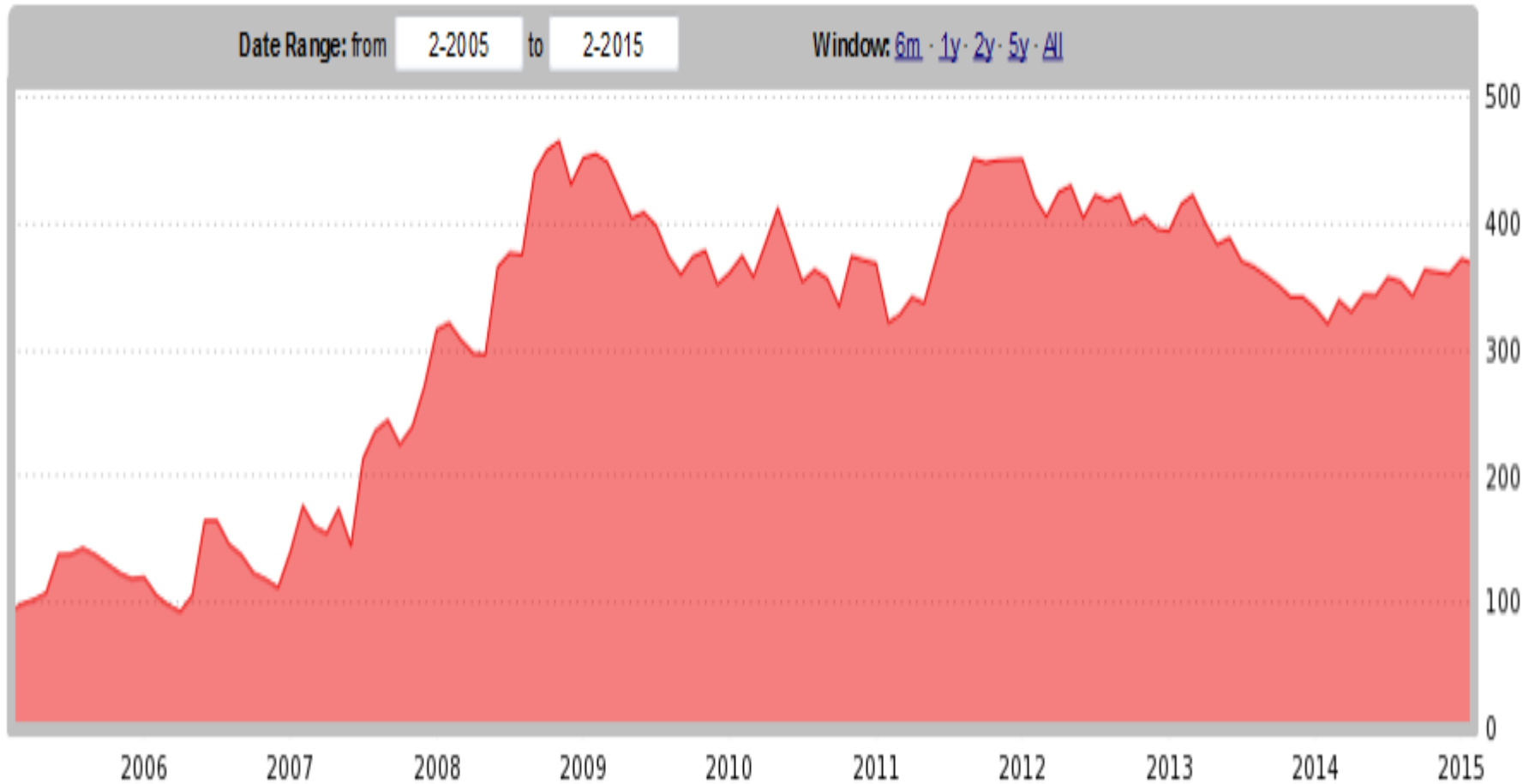
RUSSIA

Risk Analysis Overview - Russian Federation Financials Total SRISK (US\$ billion)



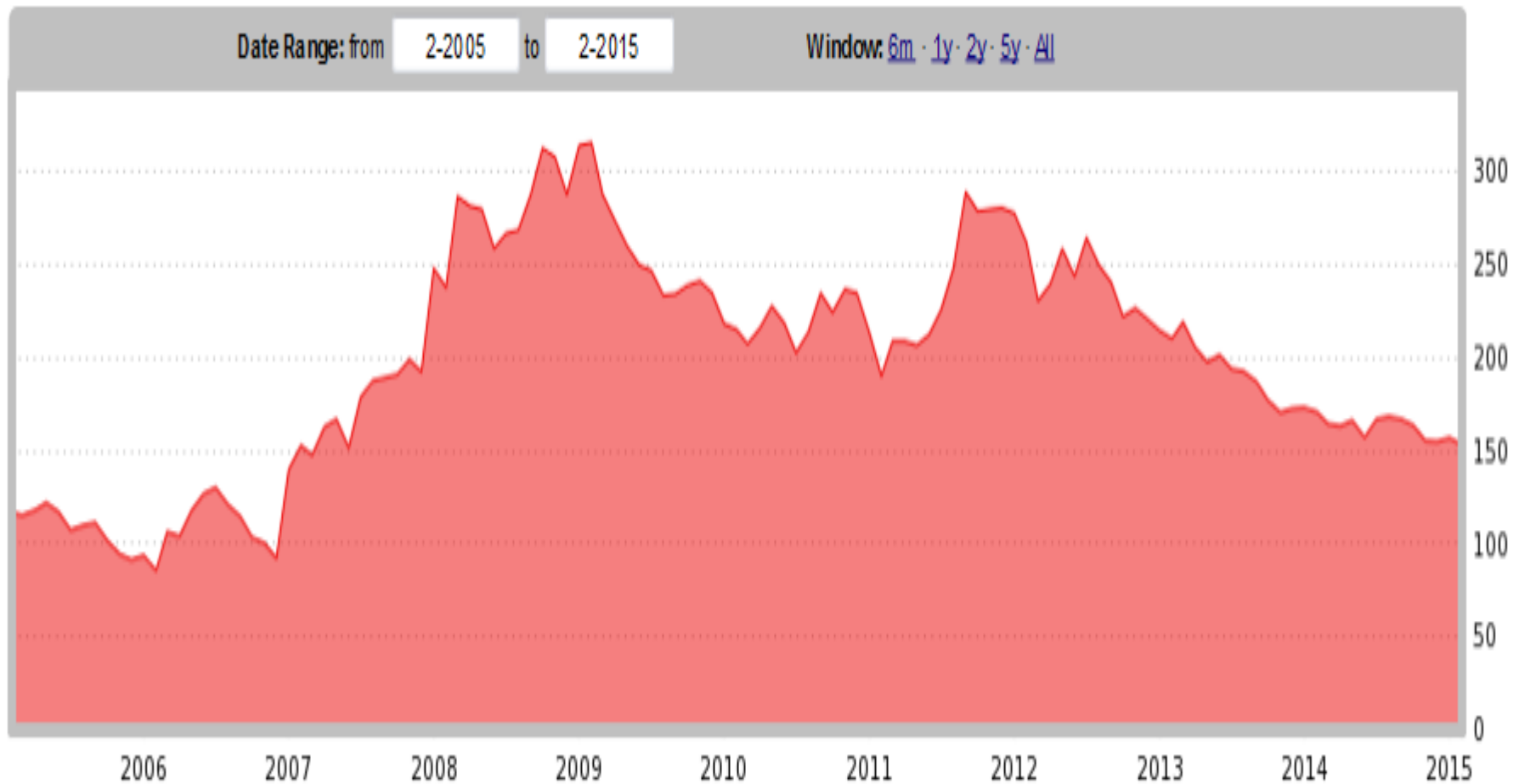
FRANCE

Risk Analysis Overview - France Financials Total SRISK (US\$ billion)



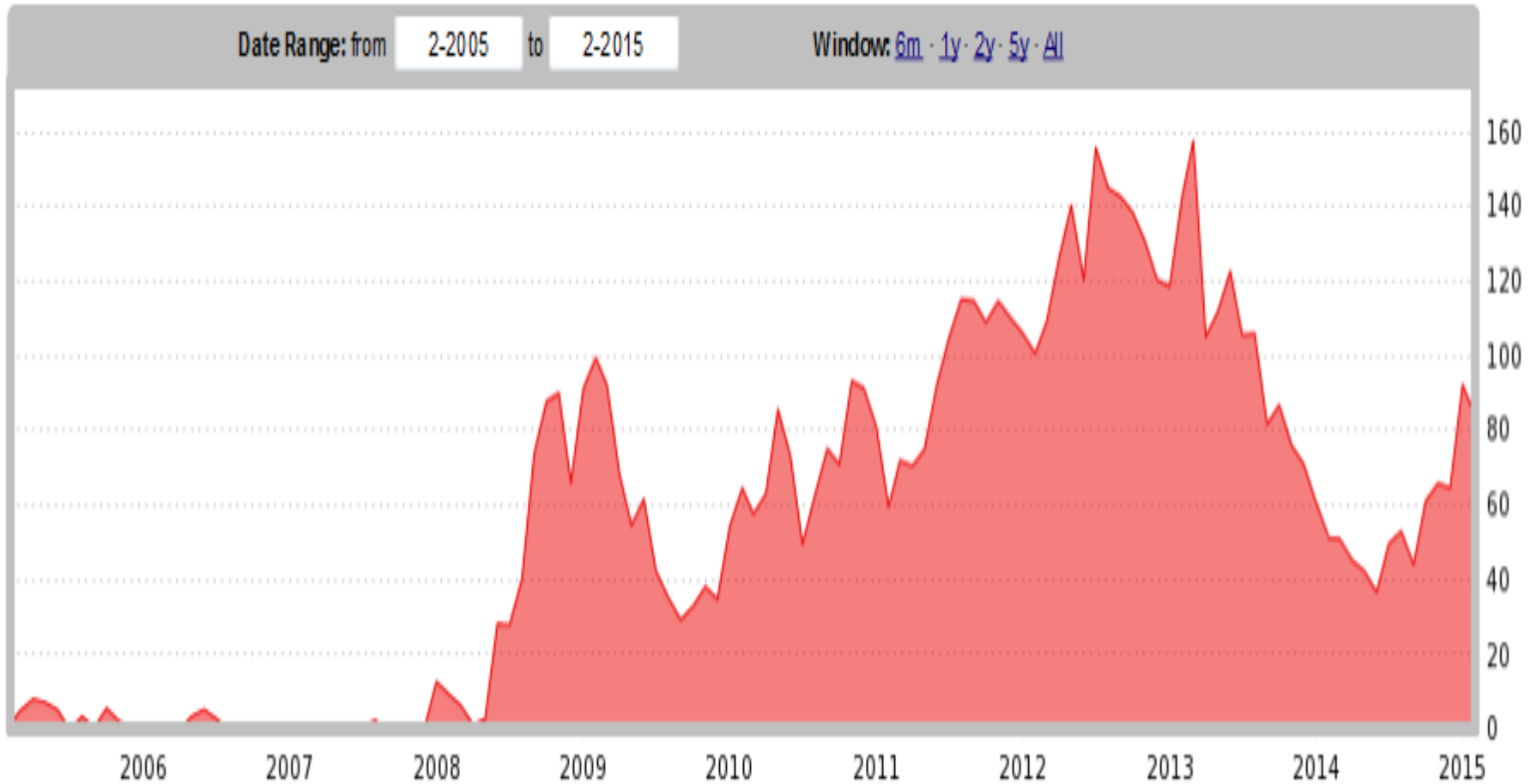
GERMANY

Risk Analysis Overview - Germany Financials Total SRISK (US\$ billion)



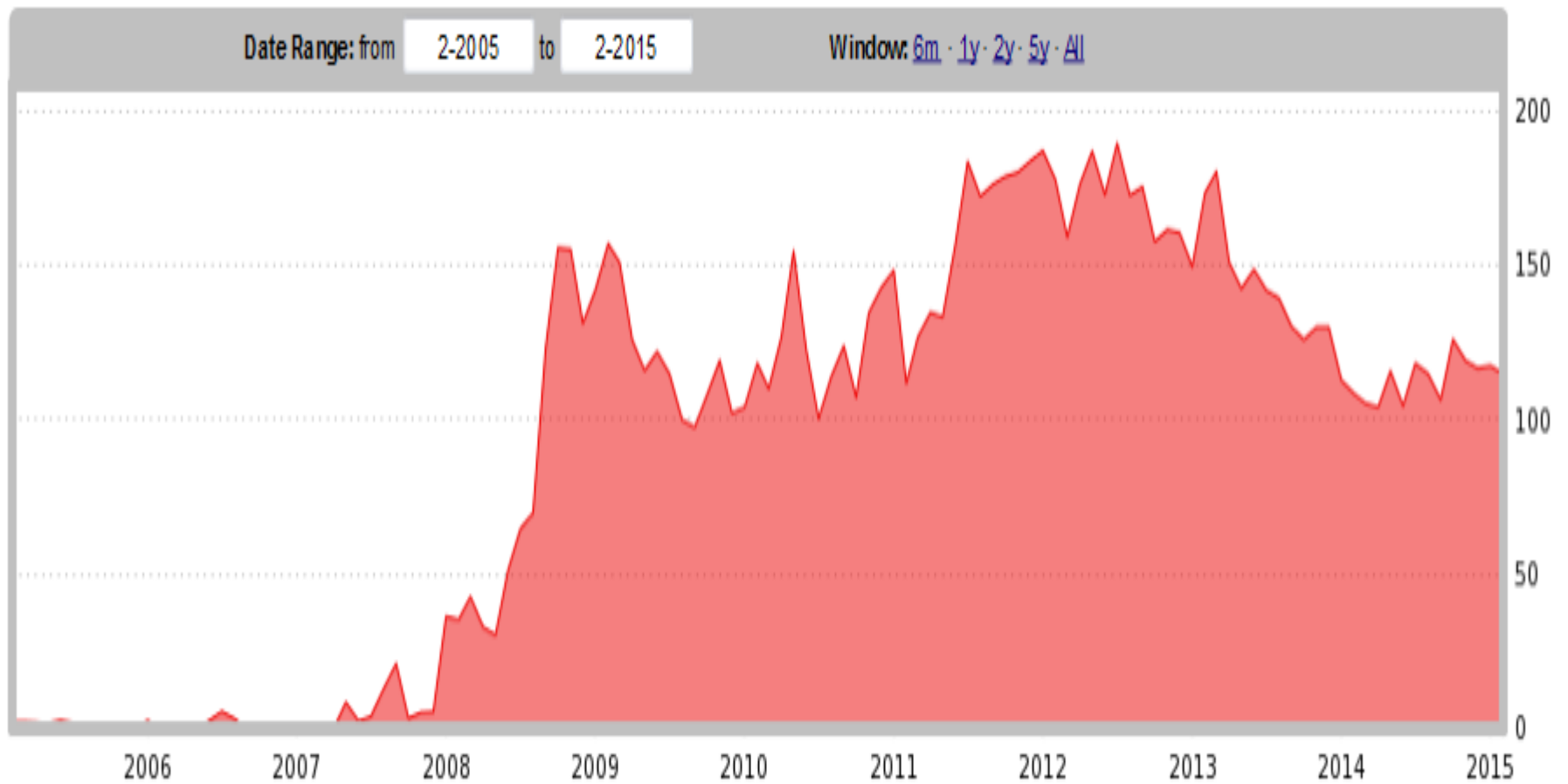
SPAIN

Risk Analysis Overview - Spain Financials Total SRISK (US\$ billion)



ITALY

Risk Analysis Overview - Italy Financials Total SRISK (US\$ billion)



ITALIAN FINANCIAL FIRMS

